

REMARKS

Claims 1-58 are presently pending in this application, but claims 3, 8-27, 30, 35, 36, 46, 47 and 49-58 have been withdrawn from consideration as being drawn to a non-elected species. None of the claims have been amended in this paper.

The status of the application as set forth in the Office Action dated January 27, 2004, is as follows:

(A) The Information Disclosure Statement filed March 3, 2003, was noted as failing to comply with 37 C.F.R. 1.98(a)(2).

(B) The title of the invention was noted as being non-descriptive.

(C) Claims 1, 2, 4, 28, 29, 31 and 44 were rejected under 35 U.S.C. § 103 over the combination of U.S. Patent No. 5,816,891 issued to ("Woo"), U.S. Patent No. 6,431,949B1 issued to Ishikawa et al. ("Ishikawa"), and U.S. Patent No. 6,340,327B1 issued to Afif ("Afif").

(D) Claims 37-43 and 48 have been allowed, and claims 5-7, 32-34 and 45 are allowable if rewritten in independent form to include all of the features of their respective base claims and any intervening claims.

A. Consideration of Information Disclosure Statement

The Information Disclosure Statement dated February 27, 2003, included a copy of all of the references listed on the form PTO/SB/08A as indicated by the signatures of the undersigned representative and Miss Rena lov on the transmittal document. More specifically, a copy of each reference and the transmittal document were sent together in a box to the U.S. Patent and Trademark Office. Further evidence that the references were filed in the U.S. Patent and Trademark Office is that the Examiner received the transmittal document. The applicant respectfully requests that the Examiner look for the copies of the cited references in the box filed with the U.S. Patent and Trademark Office to save the copying expense to the applicant. However, if the Examiner still

cannot find the copies of the references filed by the applicant, a second copy of the references will be sent at the client's expense upon request by the Examiner.

B. Amendment to the Title

The Examiner suggested that the title be amended to read "A Method for Planarizing Microelectronic Workpieces." The title has been amended in accordance with the Examiner's suggestion.

C. Response to the Section 103 Rejection

Claims 1, 2, 4, 28, 29, 31 and 44 were rejected under Section 103 over the combination of Woo, Ishikawa and Afif. Claim 1 was rejected on the grounds that Woo discloses all of the features of this claim, and the Examiner correctly admits that Woo fails to disclose planarizing a workpiece on a first planarizing surface having a first roughness, a second planarizing surface having a second roughness less than the first roughness, and an abrasive slurry on both the first and second planarizing surfaces. As explained below, it would not have been obvious to modify Woo to planarize a workpiece with the abrasive slurry taught in Afif on the first and second grinding wheels taught in Ishikawa.

1. Claim 1 Includes, *inter alia*, Pressing a Workpiece Against a First Planarizing Surface and an Abrasive Slurry on the First Planarizing Surface and Then Pressing the Workpiece Against a Second Planarizing Surface and an Abrasive Slurry on the Second Planarizing Surface

Claim 1 is directed toward a method for planarizing a microelectronic workpiece. Claim 1 includes removing material from a microelectronic workpiece during a first abrasive stage of a planarizing cycle by pressing the workpiece against a first planarizing surface and an abrasive slurry on the first planarizing surface. The method further includes removing additional material from the workpiece during a second abrasive stage of the planarizing cycle by pressing the workpiece against a second planarizing surface and an abrasive slurry on the second planarizing surface. The first planarizing surface has a first roughness, and the second planarizing surface has a second roughness. The first and second roughnesses of the planarizing surfaces,

however, are not necessarily caused by fixed-abrasive particles fixedly attached to the planarizing surfaces. Instead, the first and second planarizing surfaces can have non-abrasive surface textures.

2. Claim 1 Is Patentable Over the Combination of Woo, Ishikawa and Afif Because a Person Skilled in the Art Would Not Be Motivated to Modify the Process Taught in Woo to Come Up With the Claimed Combination of Features Based on the Disclosures of Ishikawa and Afif

Claim 1 is patentable over the combination of Woo, Ishikawa and Afif because the prior art teaches away from planarizing a workpiece on (a) the first and second grinding wheels of Ishikawa and (b) the abrasive slurry of Afif. Woo teaches that Chemical-Mechanical Planarization (CMP) procedures should produce globally planar surfaces on the finished wafers at high polishing rates. Ishikawa teaches a back-grinding tool having a first grinding wheel for roughly grinding the workpiece and a second grinding wheel for finely grinding the workpiece. In back-grinding operations, the "grinding wheels" have fixed-abrasives to mechanically grind the wafers. Afif teaches using an abrasive slurry on a polishing pad. As set forth below, a person skilled in the art would not combine the abrasive grinding wheels taught in Ishikawa and the abrasive slurry in taught in Afif with the tool taught in Woo to planarize a workpiece because the resulting process would not likely produce the globally planar surfaces sought by Woo.

A tool with the abrasive grinding wheels of Ishikawa and the abrasive slurry of Afif would likely produce undesirable results in CMP processes. One aspect of producing globally planar surfaces on a workpiece is precisely controlling the polishing rate across the surface of the workpiece, and controlling the polishing rate generally requires (a) a consistent distribution of slurry under the surface of the workpiece, (b) a consistent planarizing surface, and (c) a consistent content of abrasive particles in the abrasive slurry. Planarizing a workpiece on an abrasive wheel using an abrasive slurry, however, is inconsistent with providing a controlled polishing rate because the abrasive particles in the slurry would grind against the abrasive particles on the grinding wheels. This would likely cause a high degree of wear in discrete areas of the

grinding wheels that would likely result in an inconsistent planarizing surface. Moreover, using an abrasive slurry on an abrasive grinding wheel has also been known to cause some of the abrasive particles attached to the grinding wheel to break off. Such loose particles from the grinding wheel are likely to scratch the workpiece when they are in the slurry, and such loose particles also change the constituency of the slurry. The loose particles from the grinding wheel accordingly add another variable to CMP processes that reduces the ability to control the polishing rate. In short, because using abrasive grinding wheels in combination with an abrasive slurry compounds the complexity of the CMP process such that it becomes more difficult to produce a globally planar surface, it follows that a person skilled in the art would not modify the process taught in Woo to planarize a wafer on the abrasive grinding wheels of Ishikawa with the abrasive slurry of Afif. Claim 1, therefore, is patentable over the cited references under § 103.

Claims 28 and 44 are patentable over the cited references for the same reasons as claim 1. Claims 2, 4, 29 and 31 are patentable over the cited references because of the additional features in these claims and also because they depend from either claim 1 or claim 28.

D. Conclusion

The applicant thanks the Examiner for allowing claims 37-43 and 48, and indicating that claims 5-7, 32-34 and 45 present allowable subject matter. In view of the foregoing, the pending claims in the application comply with 35 U.S.C. § 112 and are patentable over the applied art. The applicant accordingly requests reconsideration of the application and a Notice of Allowance. Additionally, claim 1 is generic to all of the withdrawn claims, and thus applicant requests reinstatement of claims 3, 8-27, 30, 35, 36, 46, 47 and 49-58 upon allowance of claim 1. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call at (206) 359-3258.

Respectfully submitted,
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